Limits of N.P.D.	Mean Excess of R.A. above Pole. 1877–1883.	1885–6.	Diff.	Theoretical difference.
° °	s	s	s	s
1– 5	+·555	+·269	+·286	+·001
5–10	−·047	−·244	+·197	+·003
10–15	−·139	−·253	+·114	+·005
15–20	+·264	−·244	+·508	+·006
20–25	+·005	−·141	+·146	+·007
25–30	−·001	+·002	−·003	+·009
30–35	+·026	−·077	+·103	+·011
35–40	+·023	−·063	+·086	+·013
40–45	+·005	−·155	+·160	+·015
45–50	−·019	−·069	+·050	+·017

On the other hand, the reflexion observations seem to agree well with theory. These are discussed annually, as "Corrections to Adopted Level Errors," in the Greenwich volumes; and the weighted mean correction for the years 1882–3 is −0″·28, while that for 1885–6 is +0″·19, exceeding the former by +0″·47. According to the formula given above, this quantity should be +0″·57.

A New Photographic Photometer for determining Star Magnitudes.

By W. E. Wilson.

I would like to bring before the notice of the Society the design of an instrument which I think will be of use in stellar photography, and especially in determining photographic magnitude of stars.

The instrument consists of a photographic plate and holder ($6\frac{1}{2}$ in. × 1 in.), moving in a slide in the direction of its greatest length. A spiral spring tends to pull the holder to one end of the slide, and a simple electro-magnetic escapement each time the magnet is excited allows the spring to advance the plate and holder $\frac{1}{10}$ inch. The entire apparatus screws into the eye-end of a photographic telescope.

A star whose magnitude is to be determined is focussed close to the end of the photo plate, and an exposure of say 100ˢ given. The magnet is then excited for a moment by the current from a contact-maker, driven by a clock; the plate moves forward suddenly $\frac{1}{10}$ inch, and a second exposure is given, which lasts only 63ˢ. Again the plate moves forward to give a third exposure of 39ˢ·8, and the exposures are thus continued in the above ratio until they are reduced to 1ˢ. The telescope is then set on a standard star, such as *Polaris*. The holder is moved back to its original position, and *Polaris* is placed $\frac{1}{10}$ inch below

the first exposure of star No. 1. The same series of exposures are then given, and the plate developed. The result will be like this:—

The relative number of images of the two stars will give their magnitudes to 0·5. The times of exposures will vary as the number whose log. is 0·2, but there is no reason why they should not be made to give 0·1 magnitudes.

The contacts are made by a wooden disc, revolving uniformly by the driving clock of the equatoreal. On its edge are brass pins, which are placed so as to pass under a wiper at the correct intervals. The entire process is automatic once the star is set in its right place. Each plate will hold ten sets of exposures.

The instrument will also be of use for determining the actinic value of the sky before taking a stellar photograph. In this case, by taking a series of *Polaris*, and finding thus at what exposure it fails to record itself, the exposure necessary to record a star of another magnitude will be known.

Also, to determine the value of wire screens in front of the O.G., a series can be taken with and without the screen and the necessary value found.

I hope to exhibit some negatives taken with the instrument shortly before the Society.

1892 *January* 3.

The Red Stars in the Great Perseus Clusters.

By the Rev. T. E. Espin, B.A.

Although the fact that there are several red stars in G.C. 512,521 is well known, as far as I am aware their actual places have never been published, with the exception of one or two of the brighter ones. Herschell and D'Arrest each saw one, Smyth two, Birmingham three, Rev. T. W. Webb five, Rev. T. T. Smith eight. The "Observations of Nebulæ and Clusters at Birr Castle" (*Scientific Transactions of the Royal Dublin Society*, vol. ii., New Series, p. 27) mention five. As there seemed to be considerable divergence of opinion as to their number, the clusters were carefully examined on the nights of 1891 December 29 and 1892 January 1. The powers used were the sweeping power of 70, and a power of 200. The first night was remarkably fine, and the definition superb, and the sky intensely black. While examining the P cluster (G.C. 512) I had a strong suspicion that the N.P. part was nebulous. The eye-pieces were carefully cleaned,